

Sellafield Ltd: Decommissioning challenges and achievements

In the run up to our International Nuclear Decommissioning Summit we have asked our speaker Todd Wright, Managing Director at Sellafields Ltd. UK to give us an overview of the current decommissioning challenges and achievements at Sellafields.



Sellafield Overview

Sellafield Ltd is the company responsible for safely delivering decommissioning, reprocessing and nuclear waste management activities on behalf of the Nuclear Decommissioning Authority. All of the work on the site up to the mid 1950s was in support of defence programmes; however the peaceful use of nuclear energy was an issue at the forefront of world affairs at that time and coincidentally the first commercial nuclear power reactors in the world were commissioned at Calder Hall, Sellafield.

In the mid 1950s commercial opportunities were recognised, and the United Kingdom Atomic Energy Production Group was charged with identifying markets for the sale of nuclear reactors, fuel enrichment, fuel manufacture and irradiated fuel reprocessing. From the 1990s onwards Sellafield began constructing a comprehensive suite of waste management facilities to treat and dispose of the waste arising from the commercial and decommissioning operations of reprocessing. 2005 saw the ownership of Sellafield transfer to the Nuclear Decommissioning Authority (NDA) along with all other civil nuclear sites in the UK. The NDA oversee the operations and decommissioning work at Sellafield. The NDA competed the contract to operate the Sellafield site which was awarded to Nuclear Management Partners in November 2008

Today the site is home to a wide range of operations including the decommissioning of redundant buildings associated with site's early defence work; spent fuel management including Magnox and Oxide fuel reprocessing; and the safe management and storage of nuclear waste.

Decommissioning Challenges

Sellafield Ltd is accountable for cleaning up legacy wastes from over six decades of operations on the Sellafield site. The buildings and storage ponds hold some of the UK's highest nuclear hazards however due to their age and exposure to the corrosive coastal climate; many of these are degraded and will continue to deteriorate over time.

Our priority is to accelerate the decommissioning of these buildings. This will be done by designing, building and integrating waste retrieval equipment, preparing the facilities for retrieval operations and then retrieving and immobilising or treating the waste to put it into a safe state. This presents us with significant challenges, not least the scale of the challenge. By applying best available techniques and treatments to the decommissioning process we have already delivered some excellent work, and delivered it safely. We will build on this to continue to accelerate the decommissioning progress on the site.

The Sellafield site provides one of the most varied and challenging decommissioning portfolios in the world today, with both radiological and conventional hazards to overcome.

Some of the greatest challenges include:

- **Legacy plants with nuclear waste inventories that requires further treatment**

The legacy plants at Sellafield date back to the 1940s and were not designed with decommissioning in mind. They were built to the standards required at that time, rather than the standards required for today's nuclear facilities

- **Diverse and highly complex decommissioning activities**

The expansion of the site over the last five decades means many of the facilities are now tightly packed together. This creates additional challenges and restricts many conventional construction and demolition techniques from being used. Radiological conditions can also prevent manual operations and so remotely operated decommissioning vehicles have to be utilised in some areas.

- **Requirement to upgrade and improve asset conditions to prepare for decommissioning**

The existing equipment was designed to put equipment into facilities, but getting it out again was not considered. Changes to the plants such as different contents to the original design intent create additional challenges to be addressed.



- **Significant regulatory and public interest**

The site is under constant scrutiny from a wide variety of external stakeholders, ranging from regulators such as the Office of Nuclear Regulation and Environment Agency to the Local Community and Nuclear Working Groups. Significant stakeholder engagement is required to manage all their issues and maintain support.

- **Legacy Facility Challenges**

In some cases, plant historical records are limited and decommissioning teams need to commence with an understanding of the asset and subsequent upgrading of facilities before decommissioning work can commence. Much of the work is also unique and has never been done before.

Decommissioning Achievements

Some recent highlights include:

- A significant milestone was reached when we completed decommissioning of the reactor core and pressure vessel of the Windscale Advanced Gas-Cooled Reactor making it the first power-producing reactor in the UK to be decommissioned.
- We have removed the first batch of fuel from Calder Hall marking the beginning of a six year programme to remove the fuel from the reactors as decommissioning of the world's first civil nuclear power plant gathers momentum.
- We accelerated the clean up of the Pile Fuel Storage Pond when we retrieved the first batch of fuel from the pond since 1960s, five years ahead of schedule. In addition we have now started retrievals of historic sludge from the pond floor and construction of a local sludge treatment plant has been completed.
- As further emphasis on our priority of the clean up and decommissioning of the High Hazard Legacy Ponds and Silos facilities, we are now routinely transferring active liquor from a legacy silo and making significant progress towards constructing bespoke silo emptying plants for the retrieval of the radioactive wastes.
- The construction of a facility to remove waste from another 60-year-old legacy silo is progressing well with the superstructure in place and a detailed design of the retrieval access penetration into the compartments for waste retrieval completed.

- Over 98% of the contents of the largest legacy storage pond have now been mapped using a mini submarine and this has successfully been used to pick up an individual fuel rod from the pond floor and place it in a designated container.
- Construction of sludge packaging plant is underway and a 30 metre pipebridge recently being lifted into place to link the plant with a legacy fuel storage pond, to provide a route for sludge export from the pond.
- Significant progress on the construction of the Separation Area Ventilation (SAV) project - including successful completion of the ventilation stack concrete windshield - which when complete will underpin accelerated decommissioning of legacy facilities.
- Decommissioning and stripping out the Prototype Fast Reactor fuel fabrication facility, involving the removal of 57 glove boxes which have been size reduced and disposed of. The building is now an empty shell.
- The First Generation Magnox Storage Pond skip handler machine is now back in service for the first time since the 1990s after years of renovation which will pave the way for sludge and fuel retrievals.

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